UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,224	02/27/2006	Taoufik En-Najjary	0512-1296	4280

466   7590   03/16/2009
YOUNG & THOMPSON
209 Madison Street
Suite 500
ALEXANDRIA, VA 22314

EXAMINER
CHAWAN, VIJAY B

ART UNIT	PAPER NUMBER
2626	

MAIL DATE	DELIVERY MODE
03/16/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *02 December 2008*.
2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-20* is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) *1-20* is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a) ☐ All   b) ☐ Some *   c) ☐ None of:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____.
      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1.   This Office action is in response to the correspondence filed by the applicant on

12/02/08.

Specification

2.   The following guidelines illustrate the preferred layout for the specification of a
utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

        As provided in 37 CFR 1.77(b), the specification of a utility application should
include the following sections in order. Each of the lettered items should appear in
upper case, without underlining or bold type, as a section heading. If no text follows the
section heading, the phrase "Not Applicable" should follow the section heading:

    (a) TITLE OF THE INVENTION.
    (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
    (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR
        DEVELOPMENT.
    (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
    (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A
        COMPACT DISC.
    (f) BACKGROUND OF THE INVENTION.
        (1) Field of the Invention.
        (2) Description of Related Art including information disclosed under 37
        CFR 1.97 and 1.98.
    (g) BRIEF SUMMARY OF THE INVENTION.
    (h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
    (i) DETAILED DESCRIPTION OF THE INVENTION.
    (j) CLAIM OR CLAIMS (commencing on a separate sheet).
    (k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
    (l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A
        "Sequence Listing" is required on paper if the application discloses a
        nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if
        the required "Sequence Listing" is not submitted as an electronic
        document on compact disc).

Content of Specification

(a)   Title of the Invention: See 37 CFR 1.72(a) and MPEP § 606. The title of
        the invention should be placed at the top of the first page of the
        specification unless the title is provided in an application data sheet. The
        title of the invention should be brief but technically accurate and
        descriptive, preferably from two to seven words may not contain more
        than 500 characters.

(b)   Cross-References to Related Applications: See 37 CFR 1.78 and MPEP
        § 201.11.

(c)   Statement Regarding Federally Sponsored Research and Development:
        See MPEP § 310.

(d)   The Names Of The Parties To A Joint Research Agreement: See 37 CFR
        1.71(g).

(e)   Incorporation-By-Reference Of Material Submitted On a Compact Disc:
        The specification is required to include an incorporation-by-reference of
        electronic documents that are to become part of the permanent United
        States Patent and Trademark Office records in the file of a patent
        application. See 37 CFR 1.52(e) and MPEP § 608.05. Computer
        program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)),
        and tables having more than 50 pages of text were permitted as electronic
        documents on compact discs beginning on September 8, 2000.

(f)   Background of the Invention: See MPEP § 608.01(c). The specification
        should set forth the Background of the Invention in two parts:

        (1)   Field of the Invention: A statement of the field of art to which the
                invention pertains. This statement may include a paraphrasing of
                the applicable U.S. patent classification definitions of the subject
                matter of the claimed invention. This item may also be titled
                "Technical Field."

        (2)   Description of the Related Art including information disclosed under
                37 CFR 1.97 and 37 CFR 1.98: A description of the related art
                known to the applicant and including, if applicable, references to
                specific related art and problems involved in the prior art which are
                solved by the applicant's invention. This item may also be titled
                "Background Art."

(g)   Brief Summary of the Invention: See MPEP § 608.01(d). A brief summary
        or general statement of the invention as set forth in 37 CFR 1.73. The

summary is separate and distinct from the abstract and is directed toward the invention rather than the disclosure as a whole. The summary may point out the advantages of the invention or how it solves problems previously existent in the prior art (and preferably indicated in the Background of the Invention). In chemical cases it should point out in general terms the utility of the invention. If possible, the nature and gist of the invention or the inventive concept should be set forth. Objects of the invention should be treated briefly and only to the extent that they contribute to an understanding of the invention.

(h)   Brief Description of the Several Views of the Drawing(s): See MPEP § 608.01(f). A reference to and brief description of the drawing(s) as set forth in 37 CFR 1.74.

(i)   Detailed Description of the Invention: See MPEP § 608.01(g). A description of the preferred embodiment(s) of the invention as required in 37 CFR 1.71. The description should be as short and specific as is necessary to describe the invention adequately and accurately. Where elements or groups of elements, compounds, and processes, which are conventional and generally widely known in the field of the invention described and their exact nature or type is not necessary for an understanding and use of the invention by a person skilled in the art, they should not be described in detail. However, where particularly complicated subject matter is involved or where the elements, compounds, or processes may not be commonly or widely known in the field, the specification should refer to another patent or readily available publication which adequately describes the subject matter.

(j)   Claim or Claims: See 37 CFR 1.75 and MPEP § 608.01(m). The claim or claims must commence on separate sheet or electronic page (37 CFR 1.52(b)(3)). Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation. There may be plural indentations to further segregate subcombinations or related steps. See 37 CFR 1.75 and MPEP § 608.01(i)-(p).

(k)   Abstract of the Disclosure: See MPEP § 608.01(f). A brief narrative of the disclosure as a whole in a single paragraph of 150 words or less commencing on a separate sheet following the claims. In an international application which has entered the national stage (37 CFR 1.491(b)), the applicant need not submit an abstract commencing on a separate sheet if an abstract was published with the international application under PCT Article 21. The abstract that appears on the cover page of the pamphlet published by the International Bureau (IB) of the World Intellectual Property Organization (WIPO) is the abstract that will be used by the USPTO. See MPEP § 1893.03(e).

(I)   Sequence Listing, See 37 CFR 1.821-1.825 and MPEP §§ 2421-2431.
       The requirement for a sequence listing applies to all sequences disclosed
       in a given application, whether the sequences are claimed or not. See
       MPEP § 2421.02.

Claim Rejections - 35 USC § 101

3.   35 U.S.C. 101 reads as follows:

   Whoever invents or discovers any new and useful process, machine, manufacture, or composition of
   matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the
   conditions and requirements of this title.

4.   Claims 1-20 are rejected under 35 U.S.C. 101 because the claimed invention is

directed to non-statutory subject matter. Claims 1-20 are directed to a method and

system for analyzing fundamental frequency information contained in voice samples,

which does not fall into one of the enumerated four categories of patent eligible subject

matter recited in 35 U.S.C. 101 (process, machine, manufacture, or composition of

matter).

Claims 1-14 and 19-20 are not directed toward:

1) a process/method (nothing is processed/transformed, the claimed subject matter is

toward analyzing fundamental frequency information contained in voice samples); a

statutory "process" under 35 USC 101 must (a) be tied to another statutory category

(such as a manufacture or a machine), or (b) transform underlying subject matter (such

as an article or material) to a different state or thing. Claims 1-14 and 19-20 neither

transform underlying subject matter nor positively recite structure associated with

another statutory category, and therefore do not define a statutory process. The claim

scope pertains to matching source voice samples with target voice samples from two

databases as evidenced in the specification on page 16, lines 7-14.

2) a machine

Although claims 15-18 recite a system type elements, these elements are disclosed in

the specification (page 16, lines 7-14) as a software embodiment, and when treated as

a whole, claims 15-18 are more toward a non-statutory embodiment and not necessarily

a hardware embodiment.

3) a manufacture (no claim elements pertain to an output product);

4) a composition of matter (analyzing fundamental frequency information contained in

voice samples, and not a composition of matter).

Furthermore, the claims are directed to a method which analyzing fundamental

frequency information contained in voice samples, and as claimed, is a mathematical

algorithm where the claims do not produce a useful, tangible, and concrete result. If the

acts of a claimed process manipulate only numbers, abstract concepts or ideas, or

signals representing any of the foregoing, the acts are not being applied to appropriate

subject matter (Benson, 409 U.S. at 71-72, 175, USPQ at 676). Furthermore, claims

define nonstatutory processes if they simply manipulate abstract ideas (Warmerdam, 33

F.3d at 1360,31 USPQ2d at 1759). As examples of statutory transformations of

underlying subject matter (such as an article or material) to a different state or thing , in

Alappat, the claimed output smooth waveform (consisted of lighting pixels on an

oscilloscope/display); in Arrhythmia, the claimed transformation represented the

condition of a patient's heart; in State Street, the claimed transformation was data

output that represented a final share price momentarily fixed for recording and reporting

purposes and even accepted and relied upon by regulatory authorities and in

subsequent trades.

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2.   Claims 1-20 are rejected under 35 U.S.C. 102(b) as being anticipated by

Stylianou et al., ("A system for voice conversion based on probabilistic classification and

a harmonic plus noise model," Proceeding of the 1998 IEEE International Conference

on Acoustics, Speech and Signal Processing, ICASSP '98, Seattle, WA, May 12-15,

1998, vol.1, pages, 131-142).

As per claim 1, Stylianou et al., teach a method for analyzing fundamental

frequency information contained in voice samples, characterized in that it comprises at

least:

a step for the analysis of the voice samples grouped together in frames in order

to obtain, for each sample frame, information relating to the spectral envelope and

information relating to the fundamental frequency (Sections II, III and IV);

a step for the determination of a model representing the common characteristics of the spectral envelope and fundamental frequency of all said voice samples (Sections II, **III** and IV); and,

a step for the determining a prediction function for predicting the fundamental frequency exclusively, according to spectrum-related information on the basis of said information relating to the spectral envelope and voice samples (Sections II, **III** and IV).

As per claim 2, Stylianou et al., teach the method as claimed in claim 1, characterized in that said analysis step is adapted to supply said spectrum-related information in the form of cepstral coefficients (Sections II, III and IV).

As per claim 3, Stylianou et al., teach the method as claimed in claim 1, characterized in that said analysis step comprises a sub-step for modeling voice samples according to a sum of a harmonic signal and a noise signal, a sub-step for estimating frequency parameters, and at least the fundamental frequency of the voice samples, a sub-step for synchronized analysis of the fundamental frequency of each sample frame, and a sub-step for estimating the spectral parameters of each sample frame (Sections II, III and IV).

As per claim 4, Stylianou et al., teach the method as claimed in claim 1, characterized in that in that it furthermore comprises a step for normalizing the fundamental frequency of each sample frame in relation to the mean of the fundamental frequencies of the analyzed samples (Sections II, III and IV).

As per claim 5, Stylianou et al., teach the method as claimed in claim 1, characterized in that step for the determination of a model corresponds to the determination of a model by mixing Gaussian densities (Sections II, III and IV).

As per claim 6, Stylianou et al., teach the method as claimed in claim 5, characterized in that said model determination step comprises a sub-step for determining a model corresponding to a mixture of Gaussian densities, and, a sub-step for estimating the parameters of the mixture of Gaussian densities on the basis of the estimation of the maximum resemblance between the information relating to the spectral envelope and the fundamental frequency information of the samples and of the model (Sections II, III and IV).

As per claim 7, Stylianou et al., teach the method as claimed in claim 1, characterized in that said for the determination of a prediction function is implemented on the basis of an estimator of the implementation of the fundamental frequency, knowing the information relating to the spectral envelope of the samples (Sections II, III and IV).

As per claim 8, Stylianou et al., teach the method as claimed in claim 7, characterized in that said step for determining the fundamental frequency prediction function comprises a sub-step for determining the conditional expectation of the implementation of the fundamental frequency, knowing the information relating to the spectral envelope, on the basis of the a posteriori probability that the information relating to the spectral envelope is obtained on the basis of the model, the conditional expectation forming said estimator (Sections II, III and IV).

As per claim 9, Stylianou et al., teach a method for the conversion of a voice signal pronounced by a source speaker into converted voice signal whose characteristics resemble those of a target speaker, comprising at least:

a step for determining a function for the transformation of characteristics of the spectral envelope of the source speaker into characteristics of the spectral envelope of the target speaker, implemented on the basis of voice samples of the source speaker and the target speaker (Sections II, III and IV); and,

a step for transforming characteristics of the spectral envelope of the voice signal of the source speaker to be converted with the aid of said transformation function (Sections II, III and IV);

characterized in that it furthermore comprises: a step for determining a prediction function for predicting a fundamental frequency exclusively according to information relating to the spectral envelope for the target speaker, said prediction function being obtained according to the method as in claim 1, and a step for predicting the fundamental frequency of the voice signal to be converted by applying said fundamental frequency prediction function to said transformed characteristics of the spectral envelope of the voice signal of the source speaker (Sections II, III and IV).

As per claim 10, Stylianou et al., teach the method as claimed in claim 9, characterized in that the said step for determining a transformation function is implemented on the basis of an estimator of the implementation of the target spectral characteristics, knowing the source spectral characteristics (Sections II, III and IV).

As per claim 11, Stylianou et al., teach the step as claimed in claim 10,

characterized in that said step for determining a transformation function comprises

a sub-step for modeling the source and target voice samples according to a sum

model of a harmonic signal and a noise signal (Sections II, III and IV);

a sub-step for aligning the source and target samples (Sections II, III and IV);

and,

a sub-step for determining said transformation function on the basis of the

calculation of the conditional expectation of the implementation of the target spectral

characteristics, knowing the implementation of the source spectral characterizations, the

conditional expectation forming said estimator (Sections II, III and IV).

As per claim 12, Stylianou et al., teach the method as claimed in claim 9,

characterized in that said transformation function is a spectral envelope transformation

function (Sections II, III and IV).

As per claim 13, Stylianou et al., teach the method as claimed in claim 9,

characterized in that it furthermore comprises a step for analyzing the voice signal to be

converted, adapted to supply said spectrum-related information and information relating

to the fundamental frequency (Sections II, III and IV).

As per claim 14, Stylianou et al., teach the method as claimed in claim 9,

characterized in that it furthermore comprises a synthesis step, enabling the formation

of a converted voice signal at least on the basis of the transformed characteristics of the

spectral envelope and the predicted fundamental frequency information (Sections II, III

and IV).

As per claim 15, Stylianou et al., teach a system for converting a voice signal pronounced by a source speaker into a converted voice signal whose characteristics resemble those of a target speaker, said system comprising at least:

means for determining a function for transforming characteristics of the spectral envelope of the source speaker into characteristics of the spectral envelope of the target speaker, receiving, at their input, voice signals of the source speaker and of the target speaker (Sections II, III and IV); and

means for transforming characteristics of the spectral envelope of the voice signal of the source speaker to be converted by applying said transformation function supplied by the means characterized in that it furthermore comprises:

means for determining a prediction function for predicting a fundamental frequency exclusively according to information relating to the spectral envelope for the target speaker, adapted for the implementation of an analysis method as claimed in claim 1, on the basis of voice samples of the target speaker (Sections II, III and IV); and,

means for predicting the fundamental frequency of said voice signal to be converted by applying said prediction function determined by said means for determining a prediction function to said transformed characteristics of the spectral envelope supplied by said transformation means (Sections II, III and IV).

As per claim 16, Stylianou et al., teach the system as claimed in claim 15, characterized in that it furthermore comprises:

means for analyzing the voice signal to be converted, adapted to supply, at their output, characteristics of the spectral envelope information and information relating to

the fundamental frequency of the voice signal to be converted (Sections II, III and IV);

and

synthesis means enabling the formation of a converted voice signal on the basis

of at least the transformed characteristics of the spectral envelope by the means and

the predicted fundamental frequency information supplied by the means (Sections II, III

and IV).

As per claim 17, Stylianou et al., teach the system as claimed in claim 15,

characterized in that said means for determining a transformation function are adapted

to supply a spectral envelope transformation function (Sections II, III and IV).

As per claim 18, Stylianou et al., teach the system as claimed in claim 15,

characterized in that it is adapted for the implementation of a voice conversion method

comprising:

a step for determining a function for the transformation of spectral characteristics

of the target speaker, implemented on the basis of voice samples of the source speaker

and the target speaker (Sections I and II); and,

a step for transforming characteristics of the spectral envelope of the voice

signal of the source speaker to be converted with the aid of said transformation function

(Sections I and II);

a step for determining a fundamental frequency prediction function exclusively

according to spectrum-related information for the target speaker, said prediction

function being obtained with the aid of an analysis method comprising:

a step of for the analysis of the voice samples grouped together in frame in order to obtain, for each sample frame, spectrum-related information and information relating to the fundamental frequency (Sections II, III and IV);

a step for the determination of a model representing the common characteristics of the spectrum and fundamental frequency of all samples (Sections II, III and IV); and,

a step for the determination of a fundamental frequency prediction function exclusively according to spectrum-related information on the basis of said model and voice samples (Sections II, III and IV); and

a step for predicting the fundamental frequency of the voice signal to be converted by applying said fundamental frequency prediction function to said transformed characteristics of the of the voice signal of the source speaker (Sections II, III and IV).

As per claim 19, Stylianou et al., teach the method as claimed in claim 3, characterized in that said analysis step is adapted to supply said spectrum-related information in the form of cepstral coefficients (Sections II, III and IV).

As per claim 20, Stylianou et al., teach the method as claimed in claim 4, characterized in that said analysis step is adapted to supply said spectrum-related information in the form of cepstral coefficients (Sections II, III and IV).

Response to Arguments

3.   Applicant's arguments filed 12/02/08 have been fully considered but they are not

persuasive.

4.   Applicant's arguments do not comply with 37 CFR 1.111(c) because they do not

clearly point out the patentable novelty which he or she thinks the claims present in view

of the state of the art disclosed by the references cited or the objections made. Further,

they do not show how the amendments avoid such references or objections.

5.   Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount

to a general allegation that the claims define a patentable invention without specifically

pointing out how the language of the claims patentably distinguishes them from the

references.

The Stylianou reference does teach the characteristics of the spectral envelope, and

pitch synchronization, which deals with fundamental frequency of the voice signals in

section III of the article.

Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Vijay B. Chawan whose telephone number is (571) 272-

7601. The examiner can normally be reached on Monday Through Friday 6:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Richemond Dorvil can be reached on (571) 272-7602. The fax phone

number for the organization where this application or proceeding is assigned is (571)

273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

/Vijay B. Chawan/
Primary Examiner, Art Unit 2626

vbc
3/17/09